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In Re Application Of: Naoyasu MIYAGAWA, et al.

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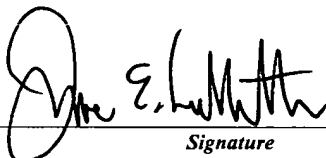
Invention: **OPTICAL RECORDING/REPRODUCING APPARATUS FOR OPTICAL DISKS WITH VARIOUS DISK SUBSTRATE THICKNESS**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on November 15, 2002.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

In re the Application

Inventors: Naoyasu MIYAGAWA, et al.

Appln. No.: 09/460,222

Filed: December 13, 1999

For: OPTICAL RECORDING/REPRODUCING APPARATUS FOR OPTICAL
DISKS WITH VARIOUS DISK SUBSTRATE THICKNESS

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APPEAL BRIEF

On Appeal From Group Art Unit 2653

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee of the present application, Matsushita Electric Industrial Co., Ltd., of Osaka, Japan.

II. RELATED APPEALS AND INTERFERENCES

There are related appeals in:

09/460,221;

09/460,222;

09/460,223;

09/609,699; and

09/609,829;

There are no related interferences.

III. STATUS OF CLAIMS

Claims 26, 28-32 and 34-38 have been presented for examination. All of these claims are pending, have been twice rejected and form the subject matter of the present appeal.

IV. STATUS OF AMENDMENTS

No amendments after final rejection have been filed. All amendments have been entered.

V. SUMMARY OF THE INVENTION

The invention of claim 26 is directed to an optical recording/reproducing apparatus for recording, reproducing or erasing an information signal onto/from any one of N types (where $N \geq 2$) of optical discs 1 having first layers of different thicknesses (col. 4, lines 6-8; Figs. 4A, 4B), each type of said optical discs 1 having at least said first layer being transparent and a second layer for storing information (Figs. 4A, 4B), by converging a light flux onto said second layer through said first layer of one of said N types of optical discs 1 loaded in said apparatus. The apparatus comprises a composite converging optical device comprising (i) a light emitting means 32 for emitting said light flux; (ii) a converging means 46 for converging said light flux on said second layer of said one of said N optical discs 1 loaded in said apparatus; and (iii) an optical wave front transforming means 54 (col. 13, line 35) disposed in an optical path connecting said light emitting means 32 and said converging

means 46 for correcting an optical wave front of the light flux. The composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs 1 (col. 13, lines 41-43), and (b) converges said light flux as a smaller spot diameter D with respect to one of said optical discs having a thinner one of said substrates onto said second layer of said loaded optical disc (col. 6, lines 7-19) and differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said converging of said light flux (col. 13, lines 41-43). The thickness of each of said first layers of said N types of optical discs is about 1.2mm or less (col. 5, line 6 from the bottom through col. 6, line 6).

The invention of claim 28 is directed to an optical recording/reproducing system comprising an optical recording/reproducing apparatus, a signal processing means and a system controlling means. The optical recording/reproducing apparatus is for recording, reproducing or erasing an information signal onto/from any selected one of N types (where $N \geq 2$) of optical discs 1 having first layers of different thicknesses (col. 4, lines 6-8; Figs. 4A, 4B), each type of said optical discs 1 having at least said light layer being transparent and a second layer for storing information (Figs. 4A, 4B), by converging a light flux on said second layer through said first layer of one of said N types of optical discs 1 loaded in said apparatus and comprises a composite converging optical device, which comprises: (i) a light emitting means 32 for emitting said light flux; (ii) a converging means 46 for converging said light flux on said second layer of said loaded one of said N optical discs; and (iii) an optical wave front transforming means 54 (col. 13, line 35) disposed in an optical path connecting said light emitting means 32 and said converging means 46 for correcting an optical wave front of the light flux; and a photo detecting means 38 for detecting reflective light from said one of said N optical discs 1. The composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs (col. 13, lines 41-43) and (b) converges said light flux as a spot with a smaller diameter D with respect to one of said optical discs 1 having a thinner one of said substrates onto said second layer of said loaded optical disc (col. 6, lines 7-19) and differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said

converging of said light flux (col. 13, lines 41-43). A thickness of each of said transparent substrates of said N types of optical discs is about 1.2mm or less (col. 5, line 6 from the bottom through col. 6, line 6). The signal processing means 19, responds to one of (i) a reproduction signal, corresponding to said information signal, from said photo detecting means 38 and (ii) receipt of recording data, corresponding to said information signal, for recording on said disk 1, to generate an output signal corresponding to said information signal for performing one of a reproducing operation and a recording operation on said disks 1. The system controlling means 22 is coupled to said signal processing means 19 for controlling generation of the output signal of said signal processing means 19.

Claim 29 depends from claim 26 and defines the composite converging optical device as having different numerical apertures (col. 28, lines 49-52), and the light flux as being converged as a spot with a smaller diameter D by employing a larger one of said numerical apertures (col. 6, lines 7-19).

Claim 30 depends from claim 26 and defines each of said first layers as comprising a transparent substrate (col. 23, line 34).

Claim 31 depends from claim 28 and defines each of said first layers as comprising a transparent substrate (col. 23, line 34).

Claim 32 depends from claim 28 and defines the composite converging optical device as having different numerical apertures (col. 28, lines 49-52), and the light flux as being converged as a spot with a smaller diameter D by employing a larger one of said numerical apertures (col. 6, lines 7-19).

Claim 34 is directed to a system comprising an optical recording/reproducing apparatus and a signal processing apparatus. The optical recording/reproducing apparatus is for recording, reproducing or erasing an information signal onto/from any selected one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses (col. 4, lines 6-8; Figs. 4A, 4B), each type of said optical discs having at least said light layer being transparent and a second layer for storing information (Figs. 4A, 4B), by converging a light flux on said second layer through said first layer of one of said N types of optical discs loaded in said apparatus and comprises a composite converging optical device, which comprises (i) a light emitting means 32 for emitting said light flux; (ii) a converging means 46 for converging said light

flux on said second layer of said loaded one of said N optical discs 1; and (iii) an optical wave front transforming means 54 disposed in an optical path connecting said light emitting means 32 and said converging means for correcting an optical wave front of the light flux; and a photo detecting means 38 for detecting reflective light from said one of said N optical discs 1. The composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs (col. 13, lines 41-43) and (b) converges said light flux as a spot with a smaller diameter D with respect to one of said optical discs having a thinner one of said substrates onto said second layer of said loaded optical disc (col. 6, lines 7-19) and differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said converging of said light flux (col. 13, lines 41-43). A thickness of each of said transparent substrates of said N types of optical discs is about 1.2mm or less (col. 5, line 6 from the bottom through col. 6, line 6). The signal processing apparatus includes signal processing means 19, responsive to one of (i) a reproduction signal, corresponding to said information signal, from said photo detecting means 38 and (ii) receipt of recording data, corresponding to said information signal, for recording on said disk 1, for generating an output signal corresponding to said information signal for performing one of a reproducing operation and a recording operation on said disks 1; and system controlling means 22 coupled to said signal processing means 19 for controlling generation of the output signal of said signal processing means 19.

Claims 35, 36 and 37 depend from claims 26, 28 and 34, respectively, and further recites a disc discrimination means for discriminating the thickness of the first layer of the disc and for generating a discrimination signal in accordance with a result of the discrimination; and a controlling means for causing the composite converging optical device to converge the light flux as a spot with a particular diameter to minimize aberration due to the first layer in accordance with said disc discrimination signal (col. 6, lines 7-19; col. 24, lines 47-51; col. 28, lines 19-26).

Claim 38 depends from claim 34 and defines each of said first layers as comprising a transparent substrate (col. 23, line 34).

The references above to the specification and drawings are for illustrative purposes only pursuant to MPEP 1206, to enable the Board to more quickly determine instances where the claimed subject

matter is described in the application. The cited subject matter is not intended to be an exhaustive citation of corresponding structure pursuant to 35 USC 112, sixth paragraph. These references are non-limiting of the scope of the invention to the referenced embodiments and no estoppel should be deemed to attach thereto.

VI. ISSUE ON APPEAL

Whether claims 26, 28-32 and 34-38 stand improperly rejected as a recapture of subject matter surrendered in the application for patent upon which the present reissue application is based.

VII. GROUPING OF CLAIMS

For the reasons set forth below in Section VIII, "Argument," the Appellants respectfully submit that each of claims 26, 28-32 and 34-38 defines subject matter which is patentable independently of the subject matter of any of the other claims.

VIII. ARGUMENT

A. The Recapture Rule is Inapplicable Because No Subject Matter Was Surrendered

I. Surrender Requires Cancellation, Amendment or Argument to Overcome a Prior Art Rejection

In re Clement, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997) stated:

"To determine whether an applicant surrendered particular subject matter, we look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection. See *Mentor*, 998 F.2d at 995-996, 27 USPQ2d at 1524-1525; *Ball Corp. v. United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 294-295 (Fed. Cir. 1984)." (emphasis added)

The test set forth in *Clement* is to analyze broadening and narrowing of the reissue claims in "areas relevant to the prior art rejections." *Id* at 1165.

II. Where There Is Both a Section 112 Rejection and a Prior Art Rejection and the Record Contains Nothing to Indicate Cancellation, Amendment or Argument to Overcome the Prior Art Rejection, There Is No Surrender Based on a Prior Art Rejection

In *re Wesseler*, 367 F.2d 838, 151 USPQ 339 (CCPA 1966), involved a situation similar to that presented in the instant application. In *Wesseler*, the cancellation of claims occurred where all pending claims stood rejected under 35 USC 112, second paragraph, as being vague and indefinite, and claims 11, 12, 20, and 21 were also rejected as unpatentable over a patent to Simmonds. The application was amended in several particulars which included adding claims 25-27 (which became patent claims 1-3) and cancelling "all claims presently active." *Id.*, at 345. The remarks accompanying the amendment stated:

"In an effort to expedite prosecution of this case and bring it to a close, this amendment after final rejection is presented for the examiner's further consideration. Applicant has herein attempted to follow completely the procedures and suggestions presented by the Primary Examiner insofar as they were understood."

"When combined with their respective interacting elements, the afore-mentioned claimed structures ostensibly [sic] effect new combinations which produce the new and highly useful result of simplifying the mounting of pipes, cables, etc. on appropriate support structures and, in addition, reduces the number of types of parts required to be carried in the storage inventory which, in turn, results in economies not occurring when using the devices of the cited prior art."

The CCPA noted that, on final rejection, the then pending claims were rejected on two grounds, i.e., the claims were "vague and indefinite" and a prior art patent defined a "fully equivalent" apparatus. The court stated that, in terms of the 1952 Patent Act, it assumed that the examiner's position was that the claims failed to point out and distinctly claim the invention, 35 U.S.C. 112, and that the subject matter claimed was obvious in view of the prior art, 35 U.S.C. 103. The court stated that:

"Insofar as the act of cancelling claims is concerned the record does not show whether this was an admission that those claims were unpatentable over the prior art or whether they were cancelled and the amended claims were submitted to cure the 'vague and indefinite' rejection." *Id.*, at 345, 346. (emphasis added)

In the present case, the Appellants, in the original application, originally filed one independent claim and 29 dependent claims, all of which depended from base claim 1. In the first office action dated August 17, 1992, the examiner rejected claims 1-29 under 35 USC §112, second paragraph, as failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Additionally, the examiner rejected claims 1 and 6 over prior art. The office action stated that claims 2-5 and 7-30 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims."

In an Amendment after the first office action, Appellants cancelled claims 1, 6, 11, 16, 21, and 26. Claims 2, 4, 5, and 7-9 were, as stated in the remarks accompanying the amendment, rewritten in independent form and also amended to overcome the §112, second paragraph, rejections." All of the claims that were not cancelled or rewritten in independent form depended from new base claims 2, 4, 5, and 7-9. Continuing, Appellants' stated "[i]t is respectfully submitted that all pending claims are now in full compliance with §112 and are in condition for allowance."

In response to this amendment, the examiner issued a notice of allowance and claims 2-5, 7-10, 12-15, 17-20, 22-25, and 27-30 issued as patent claims 1-24.

Within the two-year period required by 35 USC 251, Appellants filed the present reissue application containing claims 26-38. After some amendments, reissue claims 26, 28-32, and 34-38 remain pending and stand "rejected under 35 USC 251 as being an improper recapture of broadened claimed subject matter surrendered in the patent upon which the present reissue is based." The office action of August 16, 2002 alleges that Appellants amended the original claims "to include limitations which were specifically added to

overcome prior art rejections during the prosecution of that original patent...[,] which have now been removed from the present [reissue] application." (emphasis added)

The facts underlying the Appellants' present application are very similar to those described by the court in *Wesseler*. Prior to the cancellation of claims in the original patent application for both *Wesseler* and Appellants, all claims stood rejected as being vague and indefinite. Also, in *Wesseler*, claims 11, 12, 20, and 21 of the patent application were also rejected as unpatentable over a patent to Simmonds, and in Appellants' case, claims 1 and 6 were rejected over prior art. In *Wesseler* and in the present case, the PTO alleged improper recapture. Also, in both *Wesseler* and in the present case, the PTO alleged, either expressly or impliedly, that the Appellants had acquiesced to the rejection made by the examiner and thus surrendered the subject matter of the cancelled claims.

The CCPA stated in *Wesseler* that "[i]nsofar as the act of cancelling claims is concerned the record does not show whether this was an admission that those claims were unpatentable over the prior art or whether they were cancelled and the amended claims were submitted to cure the 'vague and indefinite' rejection." *Id.*, at 345, 346. Similarly, the record of the present application does not show whether the Appellants' cancellation of claims 1 and 6 was an admission that those claims were unpatentable over the prior art or whether they were cancelled to cure the "vague and indefinite" rejection.

The CCPA's decision in *Wesseler* is binding legal precedent for the present situation. Therefore, the law applied to the *Wesseler* situation should be similarly applied to the present situation.

Applying *In re Wesseler*, in the present case, there was no surrender invoking the recapture rule because the prosecution history and claim amendments and cancellations fail to support any inference as to whether original claims 1 and 6 were canceled to overcome a prior art rejection or to obviate a 112, second paragraph, rejection.

III. Indefiniteness of Original Claims 1 and 6 Precludes Determination of Surrendered Subject Matter

IN the Office Action of August 17, 1992, original claims 1 and 6 were rejected as vague and indefinite under 112, second paragraph, because their scope was not capable of being determined. The examiner said as much in the office action of August 17, 1992.

Although he asserted a prior art rejection, this was of the type where the examiner states "to the extent understood," the claims are rejected based on a certain reference. This Office Action issued prior to the decision in *In re Donaldson Co. Inc.*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1993). In order to obtain claims that satisfied 35 USC 112, second paragraph, it was necessary to completely rewrite claims 2, 4, 5 and 7-9 so that they no longer resembled claim 1. Original claim 6 is so indefinite that it could not be read on any embodiment of the application. Hence, due to the indefinite scope of original claims 1 and 6, it is not possible to determine what the scope of surrendered subject matter might have been.

Thus, for this further reason, there was no surrender that would give rise to a recapture bar.

B. Even Assuming Arguendo Surrender of Some subject Matter Occurred and the Recapture Rule is Applicable, the Present Reissue Claims Do Not Recapture Surrendered Subject Matter

Although the Appellants submit that the above arguments establish that no surrender occurred that would give rise to a recapture bar, they further submit that even if it were assumed arguendo that some surrender occurred, the present reissue claims would not be barred, for the following reasons.

I. Summary of the Recapture Rule

A summary of the principles underlying the recapture rule is provided in *Ex parte Gilles Baudin*, Appeal No. 2001-1042, Application No. 09/292,334, BPAI, June 13, 2001. This Decision discussed, *inter alia*, the history of the recapture rule, numerous significant court decisions that explain the rule, and the decision of the Federal Circuit in *In re Clement*, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997).

The *Clement* court stated "To determine whether an applicant surrendered particular subject matter, we look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection." *Id.*, at 1164 (emphasis added). The court further stated that the recapture rule does not apply in the absence of evidence that an Applicants' amendment was an admission that the claim scope was not in fact patentable. *Id.*, at 1164.

The *Clement* court further stated that the first step in applying the recapture rule is to determine whether and in what "aspect" the reissue claims are broader than the patent claims. This may include broadening as a result of an omitted limitation. The second step is to determine whether the broader aspects of the reissue claims relate to surrendered subject matter. In other words, the test is whether the surrendered subject matter has "crept" back into the claims. As part of this step, the surrendered subject matter must be determined. The court stated that to determine whether an applicant surrendered particular subject matter, one must look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection. See, *Mentor*, 998 F.2d at 995-96, 27 USPQ2d at 1524-25; *Ball Corp. v. United States*, 729 F.2d 1429, 1436, 221 USPQ 289, 294-95 (Fed. Cir. 1984).

The *Clement* court further stated that one way to determine if surrendered subject matter has crept back into the claims is to compare the reissue claims with the canceled claim or the claim prior to the amendment that resulted in its allowance. The court stated that the relevance of the prior art rejection to the aspect broadened or narrowed in the reissue claim is an important factor.

In *Clement*, the court articulated specific rules to clarify when recapture applies and how to identify the surrendered subject matter. The court stated that recapture applies where the reissue claim is as broad as or broader than a "canceled or amended claim" in a manner "germane to" subject matter surrendered during prosecution. By "amended claim" the court meant a claim amended in at least two separate amendments, where an earlier amended version is in effect canceled when the claim is further amended.

More particularly, the *Clement* court stated:

"...if the reissue claim is broader than the canceled or amended claim in some aspects, but narrower in others, then: (a) if the reissue claim is as broad as or broader in an aspect germane to a prior art rejection, but narrower in another aspect completely unrelated to the rejection, the recapture rule bars the claim; (b) if the reissue claim is narrower in an aspect germane to prior art rejection, and broader in an aspect unrelated to

the rejection, the recapture rule does not bar the claim, but other rejections are possible.

Although not expressly stated in *Clement*, another category (c) exists, i.e., where the reissue claim is as broad as or broader than the canceled or amended claim in an aspect germane to a prior art rejection and narrower in another aspect germane to the prior art rejection; in such case, the recapture rule may not bar the claim.

In applying the *Clement* test, the objective is to determine whether a reissue claim's broader and narrower aspects (as compared to the canceled or amended claims) relate to surrendered subject matter. The surrendered subject matter is determined by looking to the prosecution history for arguments or claim amendments made in an effort to overcome a prior art rejection.

Since *Clement*, there have been two Federal Circuit cases (*Hester Industries, Inc. v. Stein, Inc.*, 142 F.3d 1472, 46 USPQ2d 1641 (Fed. Cir. 1998) and *Pannu v. Storz Instrument, Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001)) and one Federal Claims Court decision (*B.E. Meyers & Co. v. United States*, 56 USPQ2d 1110 (U.S. Ct. of Fed. Cls. 2000)) that illustrate the *Clement* test. *Clement*, *Hester*, *Pannu* and *B.E. Meyers* are discussed below.

In re Clement

In *Clement*, in a first office action, the original claims were each separately rejected as being unpatentable in view of two prior art references (Ortner and Burns). In response to this rejection, *Clement* cancelled claim 1 and added new claim 42. Claim 42 contained four substantive limiting features that were not recited in claim 1. These four limitations are identified in Table 1, below, by numerals (1) through (4). These four features patentably distinguished claim 42 from the Ortner reference. As a result, in a second office action, the Examiner withdrew the rejection based on Ortner, but maintained the rejection with regard to the Burns reference. Subsequently, *Clement* amended the claims to recite the feature of the brightness being "at least 59 ISO in the final pulp," identified by numeral (8) in Table 1 below. These latter claims issued and it is this "at least 59 ISO" feature that the *Clement* court identifies as the germane narrowing feature included in the reissue claims. The germane broadening aspect is the omission of features (1)-(3) that were added to claim 42 to

overcome the Ortner reference. Features (1)-(3) were also recited in the patent claim but were omitted from the reissue claim, as indicated by the comments identified by numerals (9), (10), and (12) in Table 1.

The court explained its rationale for affirming the Board's recapture rejection as follows. Reissue claim 49 is broader than surrendered claim 42 in that it eliminates features (1)-(3). This broadening directly relates to a prior art rejection because, in an effort to overcome Ortner, Clement added features (1)-(3). Claim 49 omits each of limitations (1)-(3). Reissue claim 49 is narrower than surrendered claim 42 in one aspect, namely, the brightness is "at least 59 ISO in the final pulp." This narrowing relates to a prior art rejection because, during prosecution, Clement added this brightness limitation to overcome Burns. The court noted that the brightness feature of reissue claim 49 is also present in patent claim 1. Since this same feature is found in both patent claim 1 and reissue claim 49, Clement, while narrowing as to the canceled claim, did not narrow the reissue claim over the patent claim. On the other hand, the court concluded that Clement significantly broadened the reissue claim over both the patent claim and surrendered claim 42. For this reason, the court stated that "[o]n balance, reissue claim 49 is broader than it is narrower in a manner directly pertinent to the subject matter that Clement surrendered throughout the prosecution." *Id.*, at 1166. The court stated "the reissue claims are broader than the patent claims in a manner directly pertinent to the subject matter that Clement surrendered during prosecution." *Id.*, at 1166. Based on this reasoning, the court held that the reissue claims were barred by recapture estoppel.

Table 1. Clement Claim Comparison

Item	Original (Surrendered) Claim 1 Features	(Surrendered) Claim 42 Features Not Found in (Surrendered) Claim 1	Patent Claim 1 Features Not Found in (Surrendered) Claim 42	Reissue Claim 49 Changes Over Patent and Surrendered Claims
1	A method of treating a mixture of printed and contaminated waste paper in order to produce pulps for the use in the manufacture of pulp and paper boards, which method comprises:			
2	(a) forming an aqueous pulp of said waste material at low temperature, low specific mechanical energy, thereby forming a pulpable slurry and releasing the non-ink contaminants from the surface of the paper but without dispersing them inside the fibrous suspension;	(1) carrying out step (a) at room temperature; (2) using mechanical energy less than 50 KW.H/Ton in step (a)	(5) steps (a) and (b) remove substantially all the non-ink contaminants including the stickies;	Broader than surrendered claim 42 in that it omits: (9) carrying out step (a) at room temperature; (10) using mechanical energy less than 50 KW.H/Ton in step (a).

Table 1. Clement Claim Comparison

Item	Original (Surrendered) Claim 1 Features	(Surrendered) Claim 42 Features Not Found in (Surrendered) Claim 1	Patent Claim 1 Features Not Found in (Surrendered) Claim 42	Reissue Claim 49 Changes Over Patent and Surrendered Claims
3	(b) separating the non-ink contaminants from the pulp by mechanical separation, without the use of froth floatation or solvent extraction or other process, using conventional screens and centrifugal cleaners and without any further application of strong shear forces to the pulp;		(6) step (b) takes place at room temperature.	Broader than surrendered claim 42 in that it omits: (11) step (b) takes place at room temperature.

Table 1. Clement Claim Comparison

Item	Original (Surrendered) Claim 1 Features	(Surrendered) Claim 42 Features Not Found in (Surrendered) Claim 1	Patent Claim 1 Features Not Found in (Surrendered) Claim 42	Reissue Claim 49 Changes Over Patent and Surrendered Claims
4	(c) softening of the ink particles vehicles and weakening of their bondings with the surface of the fibres by submitting the pulp at a consistency of more than 15% at the simultaneous actions of (A) high temperature - between 85 and 130° C. - (B) high shear forces and (C) at least one de-inking agent, under alkaline [sic] conditions;	(3) removing the ink by applying a combination of high temperature between 85 and 130°C, mechanical energy greater than 50 KW.H/Ton, and a de-inking or chemical dispersing agent under alkaline conditions in steps (c) and (d), respectively;	(7) steps (c) and (d) include strong alkaline conditions having a pH of at least 9;	<p>Broader than surrendered claim 42 in that it omits:</p> <p>(12) removing the ink by applying a combination of high temperature between 85 and 130°C, mechanical energy greater than 50 KW.H/Ton, and a de-inking or chemical dispersing agent under alkaline conditions in steps (c) and (d), respectively;</p> <p>(13) steps (c) and (d) include strong alkaline conditions having a pH of at least 9;</p>

Table 1. Clement Claim Comparison

Item	Original (Surrendered) Claim 1 Features	(Surrendered) Claim 42 Features Not Found in (Surrendered) Claim 1	Patent Claim 1 Features Not Found in (Surrendered) Claim 42	Reissue Claim 49 Changes Over Patent and Surrendered Claims
5	(d) detaching the ink particles from the surface of the fibres and dispersing them into the fibrous suspension by submitting the pulp to the simultaneous actions of (A) high temperature - between 85 and 130° C. - (B) high shear forces and (C) at least one chemical dispersing agent, under alkaline [sic] conditions;	(4) limiting the duration of steps (c) and (d) to between two and ten minutes.		
6	(e) removing the free ink particles by means of the most appropriate known method and up to the degree of brightness required by the final use of the pulp.			

Table 1. Clement Claim Comparison

Item	Original (Surrendered) Claim 1 Features	(Surrendered) Claim 42 Features Not Found in (Surrendered) Claim 1	Patent Claim 1 Features Not Found in (Surrendered) Claim 42	Reissue Claim 49 Changes Over Patent and Surrendered Claims
7		(f) removing the detached ink particles from the fibrous suspension to provide the degree of brightness required in the final product of the pulp.	(8) the brightness of the final pulp in step (f) is at least 59 ISO	Narrower than surrendered claim 42 in that it includes the feature added to patent claim 1 to gain its allowance, which feature is: (14) the brightness of the final pulp in step (f) is at least 59 ISO.

Hester

In Hester, the applicant's original claim 1, as illustrated in Table 2 below, was rejected over the prior art. Applicant argued in multiple responses to office action rejections and in multiple briefs on appeal that the prior art failed to disclose the limitations of: (1) cooking solely with steam and (2) two steam sources. On appeal, the Board of Patent Appeals and Interferences reversed the rejection based on these arguments and allowed the application. Subsequently, Applicant filed a reissue application having a claim 24 that omitted the features recited in the patent claim of cooking solely with steam and two steam sources.

The court concluded that a surrender can occur through argument alone. The court stated that, when the surrender is made by way of argument alone, the procedure for determining whether recapture applies is to simply analyze the asserted reissue claims to determine if they were obtained in a manner contrary to the arguments on which the surrender is based. The court concluded

that the surrendered subject matter of cooking other than with steam and other than with at least two sources of steam had crept back into the reissue claim. However, the court stated that because the recapture rule may be avoided in some circumstances, it must be considered whether the reissue claims were materially narrowed in other respects. *Id.*, at 1649. See also, *Mentor*, 998 F.2d at 996, 27 USPQ2d at 1525 ("Reissue claims that are broader in certain respects and narrower in others may avoid the effect of the recapture rule"). The court noted that in *Ball* the recapture rule was avoided because the reissue claims were sufficiently narrowed (described by the court as "fundamental narrowness") despite the broadened aspects of the claims.

The *Hester* court stated that, in the context of a surrender by way of argument, in appropriate cases, the recapture rule may be overcome when the reissue claims are materially narrower in other overlooked aspects of the invention. The purpose of this exception to the recapture rule is to allow the patentee to obtain through reissue a scope of protection to which he is rightfully entitled for such overlooked aspects.

However, in *Hester*, the court found that the asserted reissue claims were not materially narrower despite the addition of the "spiral conveyance path" and "high humidity steam" limitations. The court found that the term "high humidity steam" is actually the same as or broader than the limitation in original claim 1 that this term replaced. Original claim 1 specified a steam atmosphere "at near 100% humidity 100° C and a pressure above atmospheric." *Hester* conceded that the term "high humidity steam" is not narrower than this limitation in original claim 1. In fact, with respect to the claim construction issue, *Hester* argues that the limitation in original claim 1 is but one example of "high humidity steam...." Accordingly, the use of the term "high humidity steam" did not save the reissue claims from the recapture rule. The court found further that the term "spiral conveyance path" was also not materially limiting. The court noted that original claim 1 included a corresponding limitation, namely, "means passing said conveyor belt through said housing...." The court noted that, in construing the claim according to 35 USC 112, paragraph six, the only "corresponding structure" functions to pass the conveyor belt through a spiral path. Thus, the court found that explicit recitation of a "spiral conveyance path" did not materially narrow the reissue claims.

Table 2. Hester Claim Comparison

Item	Original/Patent Claim 1 Features	Reissue Claim 24 Features	Comment Regarding Allowance of Claim 1	Comment Regarding Reissue Claim 24
1	A food cooking system cooking solely with steam foods such as fish, fowl, meats or produce carried through a cooker on a continuously running conveyor belt, comprising in combination,	A spiral steam cooker for at least partially cooking exposed food products, said cooker comprising:		Reissue claim recites "spiral" conveyance path, not found in claim 1. Applicant asserts this is a narrowing feature.
2	a cooker housing,	a housing defining an internal volume therein;		
3	means passing said conveyor belt through said housing to expose food products within the cooker housing only to said steam as the sole cooking medium, and	a conveyor belt at least partially disposed along a spiral conveyance path within said internal volume . . . ; and	Applicant argued during prosecution that cooking solely with steam distinguished claim 1 from prior art.	Reissue claim omits cooking solely with steam limitation. Therefore, this omission broadens reissue claim.
4	two sources of steam providing said steam to cook the food products, nozzles for releasing steam located inside said housing,	a steam source operatively coupled to said housing,	Applicant argued during prosecution that two sources of steam distinguished claim 1 from prior art.	Reissue claim omits two sources of steam limitation. Therefore, this omission broadens reissue claim.

Table 2. Hester Claim Comparison

Item	Original/Patent Claim 1 Features	Reissue Claim 24 Features	Comment Regarding Allowance of Claim 1	Comment Regarding Reissue Claim 24
5	one [source of steam] comprising a steam generator supplying supplemental steam into said housing at said nozzles located thereinside to maintain the atmosphere together with the other steam source at near 100% humidity 100° C and a pressure above atmospheric, and	said steam source providing a high humidity steam atmosphere within said internal volume, said high humidity steam atmosphere directly contacting and at least partially cooking the exposed food products		Reissue claim recites "high humidity steam," while claim 1 recites near 100% humidity. Applicant asserts this is a narrowing feature.
6	the other source of steam comprising a pool of water within said housing with heating means for boiling the water to create steam.			

Pannu

In *Pannu v. Storz Instrument, Inc.*, 258 F.3d 1366, 59 USPQ2d 1597 (Fed. Cir. 2001), the court affirmed the lower court's holding that the reissue claims violated the recapture rule. A detailed claim chart is as shown below in Table 3:

Table 3. Pannu Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Feature	Reissue Claim 1 Feature	Comment
1	A posterior chamber intraocular lens comprising:	An intraocular lens comprising:	An intraocular lens comprising:	Patent claim 1 and reissue claim 1 recitations are identical.
2	a lens having a width and a thickness;	a lens body;	a lens body;	Patent claim 1 and reissue claim 1 recitations are identical.
3	a retention loop including a flexible strand having a width and a thickness and such strand is joined at one end to the lens and has an opposite free end;	at least two spaced flexible positioning and supporting elements integrally formed with said lens body as a one piece construction and extending radially outward from the periphery of said lens body;	at least two spaced flexible positioning and supporting elements integrally formed with said lens body as a one piece construction and extending radially, outwardly from the periphery of said lens body;	Patent claim 1 and reissue claim 1 recitations are identical.

Table 3. Pannu Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Feature	Reissue Claim 1 Feature	Comment
4	and a snag resistant disc joined to the flexible strand's free end;	said elements defining a continuous, substantially circular arc having a diameter greater than the diameter of said lens body, said arc curved toward said lens circumference and terminating in a free end spaced from said periphery; and	said elements terminating in a free end spaced from said periphery; and	Reissue claim 1 deletes "defining a continuous, substantially circular arc having a diameter greater than the diameter of said lens body, said arc curved toward said lens circumference and" recitation that was added to overcome prior art rejection. This omitted subject matter is the germane broadening identified by the Pannu court.

Table 3. Pannu Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Feature	Reissue Claim 1 Feature	Comment
5	said snag resistant disc having a width which is at least 3 times greater than the thickness of the disc, at least 3 times greater than the width of the flexible strand, and at least 1/5 as great as the width of the lens for smoothly guiding the free end of the flexible strand across an inner edge of an iris when moving said strand into and out of a posterior chamber of an eye;	snag resistant means integrally formed on the free end of said elements for smoothly guiding and positioning the lens across contacted eye tissue when implanting the lens,	snag-resistant means integrally formed on the free end of <u>each</u> <u>of</u> said elements for smoothly guiding and positioning the lens across contacted eye tissue when implanting the lens, —	Difference between reissue claim 1 and patent claim 1 is indicated by underlining. This added subject matter is not considered important by the Pannu court.

Table 3. Pannu Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Feature	Reissue Claim 1 Feature	Comment
6	said snag resistant disc lying in a plane sufficiently close to a plane of the lens so that both the disc and lens can fit into a posterior chamber behind an eye's iris.	said snag resistant means having an uninterrupted continuously smoothly curved outer periphery which merges with said free end and is substantially greater in size than the width of said flexible elements.	said snag resistant means having an uninterrupted, continuously, smoothly curved outer periphery which merges with said free end and is [substantially] <u>at least three times</u> greater in [size] <u>width</u> than the width of said flexible elements, <u>said snag resistant elements and said positioning and supporting elements being substantially coplanar.</u>	<p>Difference between reissue claim 1 and patent claim 1 is indicated by underlining and bracketing. Features added by reissue claim 1 are underlined and features omitted from reissue claim 1 are bracketed.</p> <p>The added subject matter is the germane narrowing aspect identified by the Pannu court.</p> <p>However, the court notes that all of the added subject matter was recited in original claim 1, which was cancelled to overcome a prior art rejection (see bolded text of original</p>

In simplified form, the facts of *Pannu* are shown below:

Pannu Comparative Claim Chart

Claim	1st limitation	2d limitation	3d limitation
Original Claim	Optic	Haptic	Snag resistant disc with width substantially greater than width of haptic
Patent Claim	Optic	Haptic that defines continuous circular arc	Snag resistant disc with width substantially greater than width of haptic
Reissue Claim	Optic	Haptic	Snag resistant disc with width at least three times greater than width of haptic and substantially coplanar with haptic

In *Pannu*, the court noted that the reissue claim narrowed the patent claim in two areas. The first change altered the language describing the snag resistant means, from being "substantially greater" than the width of the haptics, to "at least three times greater" than the width of the haptics. The second change recited that the snag resistant means must be "substantially coplanar" with the haptics. The court, however, found that these narrowing aspects were not "germane to the prior art rejection." The court found that the "aspect germane to the prior art rejection" was the haptic's continuous circular arc shape that was added by amendment and argued to distinguish over the applied prior art. On the grounds that the reissue claim was as broad as the canceled claim in this aspect without any narrowing of this aspect, the court found a recapture bar.

However, the Appellants note that, applying the reasoning of *B.E. Meyers & Co. v. United States*, 56 USPQ2d 1110 (U.S. Ct. of Fed. Cls. 2000), discussed below, to the facts of *Pannu*, if a claim had been presented in *Pannu* that omitted the haptic altogether, such claim may have avoided the recapture rule

provided other subject matter were added to the reissue claim to distinguish over the prior art.

B. E. Meyers

In *B.E. Meyers*, the Court of Federal Claims found that a reissue claim did not bar the recapture rule, stating that determining whether a reissue claim is broader than a canceled claim involves more than simply counting the number of claim elements or claim limitations. The claim chart is shown below in Table 4.

Table 4. Meyers Claim Comparison				
Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Changes Over (Surrendered) Claim 1	Reissue Claim 35	Comment
1	1. An invisible light beam projector, comprising:	Same.	A device for illuminating a target with a beam of electromagnetic radiation to enhance the quality of an image of a target produced by a passive visible light intensifier and image enhancer, said device comprising:	Similar recitations in reissue and surrendered claim.
2	a tubular body having a forward end and a rearward end;	Same.	a housing;	Similar recitations in reissue and surrendered claim.
3	an invisible light beam emitting diode having an emitting lens;	Same.	a source of said electromagnetic radiation in said housing; and	Similar recitations in reissue and surrendered claim.

Table 4. Meyers Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Changes Over (Surrendered) Claim 1	Reissue Claim 35	Comment
4	mounting means inside of said tubular body mounting the diode at a location within the body, between the two ends of the body, with the lens of the diode directed towards the forward end of the body;	Same.		Surrendered claim 1 feature omitted in reissue claim.

Table 4. Meyers Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Changes Over (Surrendered) Claim 1	Reissue Claim 35	Comment
5	control circuit means for the diode adapted to be repetitiously charged and discharged, and on each discharge causing the diode to light and transmit a narrow beam of invisible light through the emitting lens towards the forward end of the tubular body; and	control circuit means for <u>causing</u> the diode [adapted] to be repetitiously charged and discharged, and on each discharge causing the diode to light and transmit a narrow beam of invisible light through the emitting lens towards the forward end of the tubular body, <u>said control circuit means functioning to turn the diode on and off at a rate resulting in the diode being on between about 10-20% of the time and off during the remainder of the time, and when on being powered by a current that is substantially larger than the diode could stand if on continuously; and</u>		Surrendered claim 1 features and the additional limitations added to these claim 1 features, by amendment, to overcome prior art are omitted in the reissue claim. This is the non-germane broadening aspect identified by the court.

Table 4. Meyers Claim Comparison

Item	Original (Surrendered) Claim 1 Feature	Patent Claim 1 Changes Over (Surrendered) Claim 1	Reissue Claim 35	Comment
6	projection lens means within the tubular body, forwardly of the diode, of a type which is always in focus in a range between a predetermined minimum distance from the light projector and infinity, said projection lens means being positioned and adapted to receive the narrow beam of invisible light from the diode lens and enlarge and collimate this light into a collimated beam of invisible light in sharp focus, to produce a lighting spot having a sharp and definite edge.	Same.	a lens system in said housing and aligned with said source for forming the energy emitted from said source into a beam with a well defined peripheral edge.	Similar recitations in reissue and surrendered claim.

In simplified form, the pertinent facts are summarized in the chart below:

B.E. Meyer's Comparative Claim Chart

Claim	limitation
Original claim	pulsing circuitry
Patent claim	pulsing circuitry with a pulsing diode and substantial pulsing current
Reissue claim	no pulsing circuitry

In *B.E. Meyers*, the court stated that the Appellants surrendered subject matter requiring a "generic" pulsing diode, by adding narrowing limitations to the pulsing diode. In the reissue claims, the limitations relating to the pulsing diode were deleted altogether. The court stated at page 1116:

"In essence, plaintiff conceded that more generic forms of pulsing circuitry had already been patented by other inventors....Contrary to defendant's argument, plaintiff's deletion of the pulsing diode and substantial pulsing current limitations did not effect an improper recapture of surrendered subject matter. The subject matter protected in the new independent reissue claims dealt only with the lens system; it had nothing to do with any type of pulsing circuitry. During the original patent prosecution, the examiner made plaintiff aware that it could not receive protection for its basic pulsing circuit design because such pulsing circuitry was already taught by the prior art. In this regard, nothing changed after the reissue process. Plaintiff still cannot rely on its reissue claims to protect any type of pulsing circuit design that is taught by the prior art, and therefore plaintiff has not used the reissue process to improperly recapture subject matter surrendered during the original prosecution. Accordingly, defendant's motion for summary judgment on the recapture issue is denied, and plaintiff's cross-motion for summary judgment on the same issue is granted." (emphasis added) *Id.*, at 1116.

The *B.E. Meyers* decision thus supports the principle that reissue claims may omit amended or added elements of the patent claims, although the reissue claims may not be permitted to reinsert the amended element in its original generic form which was surrendered.

II. The Recapture Rule Does Not Bar the Present Claims

It is noted that the Office Action of August 16, 2002 fails to make out a *prima facie* case for a recapture rejection because it fails to fully apply the tests of *In re Clement* as required by *Ex parte Donald J. Svetkoff et al.*, Appeal No. 1999-0323, Application No. 08/079,504, BPAI, March 24, 1999. The Office Actions contains no discussion of steps (1) and (2) of *Clement*. Thus, under *Ex parte Donald J. Svetkoff et al.*, the Office Action does not satisfy the burden of presenting a *prima facie* basis for a rejection of the present reissue claims based on the recapture doctrine.

Furthermore, the Appellants submit that the recapture doctrine does not bar the present claims, based on the following analysis.

In this analysis, the *Clement* test is applied through comparison of the reissue claims with the patent and canceled claims, review of the prosecution history including the comments made by the applicant during prosecution and the statements made by the Examiner such as a statement of reasons for allowance, identification of surrendered subject matter, and determination of whether the reissue claims constitute a recapture of the surrendered subject matter. *Clement's* phrase "aspect germane to the prior art rejection" is deemed to be synonymous with the surrendered subject matter. The analysis includes specific rebuttals of positions taken in the office action of August 16, 2002.

a. Overview of the Canceled Claims, the Patent Claims and the Reissue Claims

Original claim 1 and claim 6 dependent therefrom, both rejected under 35 USC 112 and 35 USC 102(e), were canceled. Claims 11, 16, 21 and 26 were canceled as redundant. Six independent patent claims issued, each of which were based on claims that originally depended directly from original claim 1 before being rewritten in independent form. Five independent reissue claims are on appeal.

b. Application of Clement to the Present Claims

1. Identification of the Aspect(s) of the Reissue Claims That Are Broader than the Patent Claims

Claim 26

Claim 26 omits express recitation of an optical head, objective lens, photo detecting means, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Claim 28

Claim 28 omits express recitation of an optical head, objective lens, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Claim 29

Claim 29 depends from claim 26 and thus its broadening aspects are the same as claim 26.

Claim 30

Claim 30 depends from claim 26 and its broadening aspects are the same as claim 26.

Claim 31

Claim 31 depends from claim 28 and its broadening aspects are the same as claim 28.

Claim 32

Claim 32 depends from claim 28 and its broadening aspects are the same as claim 26.

Claim 34

Claim 34 omits express recitation of an optical head, objective lens, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Claims 35, 36, 37

Claims 35, 36, 37 depend from claims 26, 28 and 34 respectively, and their broadening aspects are the same as claims 26, 28 and 34 respectively.

Claim 38

Claim 38 depends from claim 34 and its broadening aspects are the same as claim 34.

2. Determination of Whether the Broader Aspects Relate to Surrendered Subject Matter or Subject Matter Germane to the Prior Art Rejection

For reasons given above in Section VIII(A) of this Brief, the Appellants submit that the cancellation of claims 1 and 6 did not constitute surrender to overcome a prior art rejection and the recapture rule is inapplicable.

Further, for the following reasons, even assuming *arguendo* the recapture rule is applicable to the present case, there would be no recapture bar.

The arguments below are summarized as follows. Each of the elements of original claim 1 were included in each patent claim. Thus, these elements are not germane to the prior art rejection and may be broadened or omitted under *In re Clement*. Further, in the present case, there is no individual limitation that, standing alone, was identified in the prosecution history as distinguishing over the prior art, but rather various combinations of elements were so identified. As a result, at most, the combination of patent claim elements not found in original claim 1 is germane to the prior art rejection, and the "aspect" under *In re Clement* is the combination of elements particular to each of the patent claims that is not found in claim 1.

Accordingly, the present reissue claims avoid recapture so long as such combination of elements is narrowed even though they are also broadened. In other words, since, as noted above, none of the individual elements of the present patent claims is germane by itself to a prior art rejection, but at most a combination of such elements is germane, under *Clement*, any aspect of such combination of elements may be broadened or

omitted so long as some aspect of such combination of elements is also narrowed. Such narrowing results in a claim that is not as broad as or broader than canceled claim 1 or canceled claim 6 and thus will avoid the recapture bar.

aa. Identification of Subject Matter Germane to Prior Art Rejection

i. Comparison of the Patent Claims with Canceled Claim 1

Each of the independent patent claims resulted from a claim rewritten in independent form in response to a first action indication of allowable subject matter in one of six claims directly dependent from original claim 1. Independent patent claims 1, 7, 10, 13, 16 and 19 resulted from original claims 2, 4, 5, 7, 8 and 9, respectively. Thus, each patent claim recites a combination of features in addition to the subject matter of original claim 1. The various combinations of features may be seen from reviewing original claims 2, 4, 5, 7, 8 and 9 set forth in Exhibit I.

These combinations of features are as follows:

Patent Claim 1

N optical heads each having light emitting means, objective lenses having their aberrations respectively corrected for the N different disc substrate thicknesses, one of the objective lenses for converging the light flux emitted from the light emitting means onto the optical disc, and a plurality of photo detecting means each for detecting reflected light from the optical disc; N optical head moving means which are arranged below the disc and which move the N optical heads radially of the disc; and control means for selecting the optical head having the objective lens with the smallest aberration.

Patent Claim 7

An optical head having N converging optical systems each including light emitting means, objective lenses having their aberrations respectively corrected for the N different disc substrate thicknesses and for converging the light flux emitted from the light emitting means onto the optical disc, plural photo detecting means each for detecting reflected light from the optical disc; optical head moving means which is arranged below

the disc and which moves the optical head radially of the disc; and control means allows the light emitting means, which belongs to the converging optical system with the smallest aberration, to emit light.

Patent Claim 10

An optical head including light emitting means, light flux dividing means which are arranged in the light flux from the emitting means and divide the emitted light flux into N light fluxes and deflect in different directions, N objective lenses, whose aberrations have respectively been corrected for the N disc substrates having different thicknesses, for respectively converging the N light fluxes onto the optical disc, light flux selecting means for selecting one of the N light fluxes divided by the light flux dividing means and for allowing the light flux to pass, and photo detecting means for detecting the light fluxes reflected by the optical disc; optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc; and control means for generating a control signal to the light flux selecting means and for selecting the light flux which passes through the objective lens in which the occurrence of the aberration due to the disc substrate is smallest.

Patent Claim 13

An optical head including an optical waveguide formed on a substrate, N light emitting means each for emitting a waveguide light into the optical waveguide, N converging grating couplers, whose aberrations have respectively been corrected for the N disc substrates having different thicknesses, each for emitting the waveguide light supplied from the N light emitting means to the outside of the optical waveguide and for allowing the reflected light from the optical disc to enter, and N photo detecting means each for detecting reflected light and for generating an information signal; optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc; selecting means for selecting the light emitting means to be allowed to emit the light from among the N emitting means; and control means for generating a control signal, for providing the control signal to the selecting means, and for allowing the light emitting means to emit the waveguide light into the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest.

Patent Claim 16

An optical head including an optical waveguide formed on a substrate, light emitting means for emitting a waveguide light into said optical waveguide, light flux dividing means for dividing the waveguide light emitted from the light emitting means into N divided waveguide lights, N converging grating couplers, whose aberrations have respectively been corrected for the N disc substrates having different thicknesses, each for emitting each of the N divided waveguide lights to the outside of the optical waveguide and for allowing the reflected light from the optical disc to enter, and N photo detecting means for respectively detecting the reflected lights from the N converging grating couplers and for generating information signals; optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc; output switching means for selecting and outputting one of the output signals of the N photo detecting means; and control means for generating a control signal to the output switching means and for selecting the photo detecting means into which the waveguide light enters from the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest.

Patent Claim 19

An optical head including an optical waveguide formed on a substrate, light emitting means for emitting a waveguide light into the optical waveguide, optical path switching means which is arranged on an optical path of the waveguide light and switches the propagating direction of the waveguide light in N directions in accordance with a control signal, N converging grating couplers, whose aberrations have respectively been corrected for the N disc substrates having different thicknesses and which are respectively arranged in the N propagating directions which are switched by the optical path switching means and emit the waveguide light to the outside of the optical waveguide and allow the reflected light from the optical disc to enter, and photo detecting means for detecting the reflected light and generating an information signal; optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc; and control means for generating a control signal to the optical path switching means in accordance with the discrimination signal and for switching the propagating direction of the waveguide light from the light

emitting means to the direction of the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest.

It is submitted that no individual feature of these combinations of features may reasonably be considered as critical or essential to patentability. In brief, this is because (as may be seen from the Section below comparing the patent claims with original claim 6) first, canceled claim 6 recited many of the individual features of the above-noted combinations, but these features were not deemed sufficient by the Examiner to render original claim 6 allowable. Secondly, no feature that (a) is recited in any patent claim and (b) distinguishes over original claim 6 is common to all of the patent claims; no such feature is critical or essential for patentability over original claim 6 because, if it were, it would be recited in every allowed claim.

Thus, it is submitted that no individual feature of any of the patent claims is by itself germane to the prior art rejection, but rather it is the above-noted combinations of features that constitute the "aspect germane to the prior art rejection" under *Clement*.

Finally, it is noted that, as to the discrimination means and the control means recited in original claim 1, these elements are recited in claim 6, as well as in each patent claim. Thus, these elements do not constitute an "aspect germane to the prior art rejection."

ii. Comparison of the Patent Claims with Canceled Claim 6

Exhibit III contains a set of charts comparing canceled claim 6 with each independent patent claim. Also, set forth below is a summary chart of such comparisons.

Summary Chart of Claim 6 and Patent Claims							
Item	Feature	Equally Broad Feature in Patent Claim					
		1	7	10	13	16	19
1	N converging means comprises objective lens and aberration correcting means	√	√	√	√	√	√

Summary Chart of Claim 6 and Patent Claims

Item	Feature	Equally Broad Feature in Patent Claim					
		1	7	10	13	16	19
2	an optical head having		√	√	√	√	√
3	light emitting means			√		√	√
4	said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc	√	√	√			
5	photo detecting means for detecting the reflected light from the optical disc			√			√
6	said N aberration correcting means, and	√	√	√	√	√	√
7	holding means for holding said N aberration correcting means, for selecting one of the N aberration correcting means in accordance with a control signal and for moving onto an optical path between the light emitting means and the optical disc						
8	optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc		√	√	√	√	√
9	disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating the discrimination signal according to the result of the discrimination, and	√	√	√	√	√	√
10	control means for generating the control signal to said holding means in accordance with the discrimination signal and for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,						
11	wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	√	√	√	√	√	√

Inspection of Exhibit III and the above summary chart reveals the following.

Each of the features of claim 6 has an identical equally

broad corresponding element in at least one of the independent patent claims; the exceptions are the holding means, which the patent claims lack altogether and which is therefore not pertinent, and the control means, which is actually narrower in claim 6 than in various patent claims. Thus, every element of claim 6 is either (a) found in equally broad form in at least one independent patent claim or (b) missing altogether from all of the patent claims. Moreover, (c) no feature of the patent claims not found in claim 6 is common to all patent claims. Therefore, no such feature is critical or essential for patentability because, if it were, it would be recited in every allowed claim. In other words, as one example, standing alone, $N \geq 2$ optical heads are not required in a combination claim that distinguishes over the prior art. Moreover, the fact that an optical head is recited in several other patent claims clearly indicates that this feature, in and of itself, was not surrendered during the prosecution.

Accordingly, it is submitted that comparison of original claim 6 with the patent claims reveals no element or feature that by itself can be considered to be critical to patentability, i.e., such analysis reveals no individual element that by itself constitutes an "aspect germane to the prior art rejection" under *Clement*.

iii. Prosecution History

The prosecution history is very brief, and the record is silent as to the reasons for the amendments and the cancellation of claims 1 and 6.

There was no Preliminary Amendment.

In the first Office Action dated August 17, 1992, original claims 1 and 6 were rejected under 35 USC 102(e) as anticipated by Nishiuchi et al. (USPN 5,097,464) and under 35 USC 112, second paragraph. In supporting the prior art rejection, the Office Action stated that Nishiuchi et al. show:

"an optical recording and reproducing apparatus comprising N converging means (elements 8 and 9 of Figure 1 and Figures 2(a)-2(d)), disc discriminating means 10, and control means 11 & 16. With respect to the limitation of claim 6 see

Figure 1 elements 3 regarding the light source, objective lens 8, photodetectors 14 & 15, selecting one of the aberration correcting means Figures 2(a)-2(d), disc discriminating means 10 and control means 11 and 16."

While indicating that claims 2-5 and 7-30 were directed to allowable subject matter, the Office Action stated that:

"None of the cited prior art shows or teaches an optical head apparatus comprising a plurality of heads (objective lenses) or converging grating couplers, a light beam, photodetectors, moving means, selective means, a disc discriminating means and a control means for generating a control signal to the selecting means to select a grating coupler or an optical head (objective lens) in which the occurrence of aberration of the disc is smallest in accordance with the disc discrimination signal."

In a first and sole Amendment, claims 1, 6, 11, 16, 21 and 26 were canceled, and claims 2-5 and 7-10, 12-15, 17-20, 22-25 and 27-30 (deemed allowable in the Office Action) were rewritten in independent form where appropriate, so as to be placed in condition for allowance. Claims 11, 16, 21 and 26 were canceled for formal reasons (redundancy) not related to the prior art rejection. Claims 2, 4, 5 and 7-9 were also extensively amended to overcome the 35 USC 112, second paragraph, rejections.

The Applicant made no arguments during prosecution.

There was no statement of reasons for allowance in the Notice of Allowability.

iv. Significance of Examiner's Statements During Examination

When the result of the above comparisons of original claims 1 and 6 and the patent claims is related to the Examiner's statements in the office action of August 17, 1992, it becomes apparent that the Examiner's reasons for allowability in the office action do not identify any element which, standing alone, is essential for patentability and thus are not meaningful for a

recapture analysis. Moreover, in accordance with *Ex Parte Kozo Yamaguchi et al.*, Appeal No. 2001-1596, Application No. 09/296,102, BPAI, July 31, 2001, the fact that the Appellants made no statement rebutting the reasons for allowance did not give rise to any implication that the Appellants agreed with or acquiesced in the reasoning of the examiner, given the last two sentences of 37 CFR 1.109 in existence during prosecution of the parent application. In any event, the actual patent claims themselves rebut the examiner's statements, as noted below.

Referring to the quotations from the office action in the immediately preceding Section above, the following subject matter of an optical head apparatus is identified in the office action as distinguishing over the prior art; next to each identified subject matter, it is shown why this subject matter, standing alone, cannot be considered as necessary for patentability:

(1) a plurality of heads (objective lenses) or converging grating couplers

Each of patent claims 7, 10, 13, 16 and 19 recites an optical head; only patent claim 1 recites more than one optical head.

(2) a light beam

None of the patent claims refers to a light beam, but rather each refers to reflected light.

(3) photodetectors

It is assumed this means plural photodetectors; however, claims 10 and 19 recite a photodetector.

(4) moving means

Canceled claim 6 recites an optical head moving means; patent claims 7, 10, 13, 16 and 19 recite an optical head moving means. Since this element was not sufficient to impart patentability to claim 6, it cannot be considered by itself an "aspect germane to the prior art rejection."

(5) selective means

Claims 1, 10 and 16 recite a control means for selecting,

and claim 13 recites a selecting means; also, original claim 6 recites a control means and a holding means that cooperate to select one of the N aberration correcting means.

(6) disc discriminating means

Original claim 1 recites this element, as does original claim 6; this is also recited in each of the patent claims. It cannot be considered even in combination with other elements an "aspect germane to the prior art rejection."

(7) control means for generating a control signal to the selecting means to select a grating coupler or an optical head (sic, the grating coupler is part of the optical head in the grating coupler embodiments) (objective lens) in which the occurrence of aberration of the disc is smallest in accordance with the disc discrimination signal

Claim 6 has such a feature; some of the patent claims have a similar feature. It cannot be considered by itself an "aspect germane to the prior art rejection."

As noted in the preceding Section (ii) above, every limitation in claim 6 is found in equally broad form in at least one of the independent patent claims; only the holding means of claim 6 and the exact control means do not have correspondence in at least one patent claim. Of course, therefore, the holding means was not identified by the Examiner as a reason for allowance.

From the foregoing, it is submitted that the Examiner's reasons for allowance in the office action of August 17, 1992 were not meaningful in a recapture analysis. The statement did not identify any limitation found in every patent claim that was not recited in claim 6; thus, no cited element by itself is an "aspect germane to the prior art rejection." To reiterate one example, the statement of reasons for allowance identified "two optical heads;" however, patent claims 7, 10, 13, 16 and 19 recited "an" optical head. Similar problems exists with respect to each of the elements cited in the statement of reasons for allowance.

v. Rebuttal of Specific Elements Cited in Office Action of August 16, 2002 in the Present Reissue Application

The Appellants note the following with respect to the features cited by the Examiners in the paragraph bridging pages 2 and 3 of the office action of August 16, 2002.

(1) "N optical heads, N being greater than or equal to 2"

Not all patent claims recite N optical heads, but some recite an optical head. Also, original claim 6 recited an optical head.

Thus, this feature, standing alone, was not sufficient for patentability of claim 6, and cannot be considered, by itself, a feature critical to patentability.

(2) objective lenses "whose aberrations have respectively been corrected for said N disc substrates having different thicknesses"

Original claim 1 recited N converging means "whose aberrations have respectively been corrected for said N disc substrates having different thicknesses" and original claim 6 called for the N converging means to each include an objective lens. Thus, claim 6 recited more than one objective lens and also recited the corrected aberrations feature.

Thus, this feature standing alone was not sufficient for patentability of claim 6, and cannot be considered by itself a feature critical to patentability.

"a plurality of" photo detecting means

all patent claims recite a "plurality" of photo means, e.g., claims 10 and 19 recite "a" photo means.

, plural photo detecting means cannot be itself be to patentabililty since claims 10 and 19 lacked this attter.

control means for "allowing"

Patent claims 1, 10, 13, 16 and 19 lack any control means for "allowing;" thus, this feature cannot, by itself, be critical to patentability.

(5) control means... "for providing said control signal to said selecting means and for allowing the light emitting means for"

This language is not present in any of the patent claims. Thus, the Examiner's point is not appreciated. Claims 7, 16 and 19 lack a control signal provided to a selection means, and as noted above, claims 1, 10, 13, 16 and 19 lack any control means for "allowing." Thus, whatever is meant by this language in the office action, it cannot refer to any subject matter essential to patentability.

vi. Rebuttal in Response to Requirement on Page Three of Office Action of August 16, 2002

Regarding the requirement in the office action of August 16, 2002 of an explanation of all limitations deleted from each of the independent claims of the original patent, which had been added to establish patentability (e.g., added from the dependent claims to the independent claims)," the Appellants respond as follows.

First, it is noted that the present case is distinguishable from *Pannu* cited in the present Office Action of August 16, 2002. In *Pannu*, the prosecution history was simple. The original claim recited a haptic. The claim was amended to contain a haptic with a particular shape. This limitation was argued to distinguish over the prior art. The patent claim issued with the limitation. And the reissue claim recited merely a haptic without the shape limitation. In contrast, in the present case, it has been shown in the above sections that there is no single limitation that, by itself, was identified in the prosecution history as distinguishing over the prior art, but rather various combinations of elements were so identified. As established by the detailed discussions in the above Sections, neither the prosecution history of the original patent nor the present office action identifies any single element or feature that is essential to patentability. Rather it is combinations of features present in the independent patent claims but not in original claim 1 that formed the basis for patentability.

Thus, under *In re Clement*, if there is both germane narrowing and germane broadening of such combinations of features, there is no recapture bar and the present reissue claims should be allowed.

vii. Conclusion- The Aspect Germane to the Prior Art Rejection

In view of the above points, it is submitted that in the present circumstances, the "aspect germane to the prior art rejection" is defined by a combination of features taken together and not to any individual feature of the patent claims. There is no surrender with respect to any particular limitation recited in the patent claims, but only a combination of features. This combination of features is identified in any one of original application claims 2, 5, 7, 8 and 9.

bb. Under Clement, the Present Claims Contain Both Germane Broadening and Germane Narrowing and Thus Are Not Barred by the Recapture Rule

Applying the test of *In re Clement* to the facts of the present case, it is submitted that each of the reissue claims contains both narrowing and broadening of the "aspect germane to the prior art rejection" and no recapture bar exists.

Broader and narrower aspects of the present reissue claims that relate to the "aspect germane to the prior art rejection" under *In re Clement* are identified below.

Claim 26

Germane Broadening

Claim 26 omits express recitation of an optical head, objective lens, photo detecting means, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Germane narrowing

Claim 26 includes germane narrowing of the system for converging the light flux and the system for performing aberration correction. Claim 26 also defines a preamble that is different from the preamble of canceled claims 1 and 6, as well as all patent claims, in that claim 26 defines an optical recording/reproducing apparatus as recording, reproducing or erasing an information signal onto/from any one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said

optical discs having at least said first layer being transparent and a second layer for storing information.

The germane narrowing of the system for converging the light flux and the system for performing aberration correction is as follows.

Claim 26 recites a composite converging optical device including a light emitting means, a converging means for converging a light flux on the second layer of the optical discs and an optical wave front transforming means disposed in an optical path connecting the light emitting means and the converging means for correcting an optical wave front of the light flux, wherein the composite converging optical device performs aberration correction and converges the light flux as a spot with a smaller diameter D and performs aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers.

In their converging means, canceled claims 1 and 6, and the independent patent claims, do not recite (1) an optical wave front correcting means, (2) a light flux as a spot with a smaller diameter D, or (3) converging the light flux as a spot with a smaller diameter D and performing aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers. Claim 26 further recites (4) a thickness of each of said first layers of said N types of optical discs is about 1.2mm or less. Neither canceled claim 1 nor 6, nor any of the independent patent claims, recites this subject matter.

These are all narrowing aspects germane to the prior art rejection. Thus, recapture is avoided.

Claim 28

Germane narrowing

Claim 28 omits express recitation of an optical head, objective lens, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Germane Narrowing

Claim 28 includes germane narrowing of the system for converging the light flux and the system for performing aberration correction. Claim 28 also defines a preamble that is different from the preamble of canceled claims 1 and 6, as well as all patent claims, in that claim 28 defines an optical recording/reproducing apparatus as recording, reproducing or erasing an information signal onto/from any one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said optical discs having at least said first layer being transparent and a second layer for storing information.

The germane narrowing of the system for converging the light flux and the system for performing aberration correction is as follows.

Claim 28 recites a composite converging optical device including a light emitting means, a converging means for converging a light flux on the second layer of the optical discs and an optical wave front transforming means disposed in an optical path connecting the light emitting means and the converging means for correcting an optical wave front of the light flux, wherein the composite converging optical device performs aberration correction and converges the light flux as a spot with a smaller diameter D and performs aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers.

In their converging means, canceled claims 1 and 6, and the patent claims, do not recite (1) an optical wave front correcting means, (2) a light flux as a spot with a smaller diameter D, or (3) converging the light flux as a spot with a smaller diameter D and performing aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers. Claim 28 further recites (4) a thickness of each of said first layers of said N types of optical discs is about 1.2mm or less. Neither canceled claim 1 nor 6, nor any of the patent claims, recites this subject matter.

Additionally, claim 28 recites (1) a signal processing means, responsive to one of (i) a reproduction signal, corresponding to the information signal, from the photo detecting means and (ii) receipt of recording data, corresponding to the information signal, for recording on the disk, for generating an output signal corresponding to the information signal for performing one of a

reproducing operation and a recording operation; and (2) a system controlling means coupled to the signal processing means for controlling generation of the output signal of the signal processing means. These are also narrowing aspects germane to the prior art rejection. Thus, recapture is avoided due to these further germane narrowing aspects.

Claim 29

Claim 29 depends from claim 26 and thus its broadening aspects are the same as claim 26. Claim 29 has further germane narrowing in that it defines the composite optical converging device as having different numerical apertures and it defines the light flux as being converged as a spot with a smaller diameter D by employing a larger one of the numerical apertures.

Claim 30

Claim 30 depends from claim 26 and its broadening and narrowing aspects are the same as claim 26.

Claim 31

Claim 31 depends from claim 28 and its broadening and narrowing aspects are the same as claim 28.

Claim 32

Claim 32 depends from claim 28 and its broadening aspects are the same as claim 26. Claim 32 has further germane narrowing in that it defines the composite optical converging device as having different numerical apertures and it defines the light flux as being converged as a spot with a smaller diameter D by employing a larger one of the numerical apertures.

Claim 34

Germane Broadening

Claim 34 omits express recitation of an optical head, objective lens, optical head moving means, control means, optical waveguide, a converging grating coupler, selecting means, light flux dividing means, output switching means, and optical path switching means.

Germane Narrowing

Claim 34 includes germane narrowing of the system for converging the light flux and the system for performing aberration correction. Claim 34 also defines a preamble that is different from the preamble of canceled claims 1 and 6, as well as all patent claims, in that claim 35 defines an optical recording/reproducing apparatus as recording, reproducing or erasing an information signal onto/from any one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said optical discs having at least said first layer being transparent and a second layer for storing information.

The germane narrowing of the system for converging the light flux and the system for performing aberration correction is as follows.

Claim 34 recites a composite converging optical device including a light emitting means, a converging means for converging a light flux on the second layer of the optical discs and an optical wave front transforming means disposed in an optical path connecting the light emitting means and the converging means for correcting an optical wave front of the light flux, wherein the composite converging optical device performs aberration correction and converges the light flux as a spot with a smaller diameter D and performs aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers.

In their converging means, canceled claims 1 and 6, and the patent claims, do not recite (1) an optical wave front correcting means, (2) a light flux as a spot with a smaller diameter D, or (3) converging the light flux as a spot with a smaller diameter D and performing aberration correction at the spot by employing a larger one of the numerical apertures, with respect to one of the optical discs having a thinner one of the first layers. Claim 34 further recites (4) a thickness of each of said first layers of said N types of optical discs is about 1.2mm or less. Neither canceled claim 1 nor 6, nor any of the patent claims, recites this subject matter.

Additionally, claim 34 recites a signal processing apparatus which includes (1) a signal processing means, responsive to one of (i) a reproduction signal, corresponding to the information signal, from the photo detecting means and (ii) receipt of recording data,

corresponding to the information signal, for recording on the disk, for generating an output signal corresponding to the information signal for performing one of a reproducing operation and a recording operation; and (2) a system controlling means coupled to the signal processing means for controlling generation of the output signal of the signal processing means. These are also narrowing aspects germane to the prior art rejection. Thus, recapture is avoided due to these further germane narrowing aspects.

Claims 35, 36, 37

Germane Broadening

Claims 35, 36, 37 depend from claims 26, 28 and 34 respectively, and their broadening aspects are the same as claims 26, 28 and 34 respectively.

Germane Narrowing

Claims 35, 36, 37 have further narrowing aspects in that they recite a disc discrimination means for discriminating the thickness of the first layer of the disc and for generating a discrimination signal in accordance with a result of the discrimination; and a controlling means for causing the composite converging optical device to converge the light flux as a spot with a particular diameter to minimize aberration due to the first layer in accordance with said disc discrimination signal.

Claim 38

Claim 38 depends from claim 34 and its broadening and narrowing aspects are the same as claim 34.

IX. CONCLUSION

Under *In re Clement*, in order to determine whether an applicant surrendered particular subject matter, the prosecution history must be reviewed for arguments and changes to the claims made in an effort to overcome a prior art rejection. The test set forth in *Clement* is to analyze broadening and narrowing of the reissue claims in "areas relevant to the prior art rejections." Thus, in the present case, to determine whether, under *Clement*, there was surrendered subject matter and whether such subject matter is recaptured by the present reissue claims, it must be

determined whether or what the Appellants admitted during prosecution was necessary to distinguish over the applied prior art.

Applying the principles of the CCPA decision in *In re Wesseler* to the present case, there was no surrender invoking the recapture rule because the prosecution history and claim amendments and cancellations fail to support any inference as to whether original claims 1 and 6 were canceled to overcome a prior art rejection or to obviate a 112, second paragraph, rejection. Thus, there is no evidence of an admission that the claims were amended in an effort to overcome a prior art rejection.

Further, even assuming some surrender occurred, there still is no recapture bar.

The present facts present unique and complex circumstances as follows:

(1) all claims except claims 1 and 6 were deemed allowable in the first office action;

(2) Claims 1 and 16 were rejected based on prior art and indefiniteness;

(3) claim 6 depended from claim 1 and recited a combination of elements which overlapped with those of the various allowable claims;

(4) in response to the first office action, the allowable claims were placed in independent form, and claims 1 and 6 were canceled;

(5) all of the rewritten allowable independent claims contained a combination of elements not present in canceled claim 1;

(6) every element of canceled claim 6 is found in equally broad form in at least one of the rewritten allowable independent claims, except for the holding means, which the patent claims lack altogether and which is therefore not pertinent to recapture, and the control means, which is actually narrower in claim 6 than in various patent claims; thus, every element of claim 6 is either (a) found in equally broad form in at least one independent patent claim or (b) missing altogether from all of the patent claims; and

(7) no feature of the patent claims not found in claim 6 is common to all patent claims.

In view of the above, it is clear that no feature of original claim 6 is critical or essential to patentability because, if it were, it would be recited in every allowed claim. As a result, no

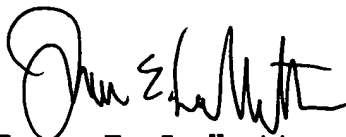
individual element of original claim 6 by itself constitutes an "aspect germane to the prior art rejection" under *Clement*.

Instead, it is the combination of features in the patent claims that differ from original claim 1 that is the "aspect germane to the prior art rejection" under *Clement*.

Because there is significant germane narrowing, in each of the present reissue claims, relative to this "aspect germane to the prior art rejection," there is no recapture bar under the test set forth in *Clement*.

For all the foregoing reasons, it is respectfully submitted that none of the present reissue claims recaptures subject matter surrendered in the original application. Therefore, reversal of all outstanding grounds of rejection is respectfully solicited.

Respectfully submitted,



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X. APPENDIX: THE CLAIMS ON APPEAL

26. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal onto/from any one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said optical discs having at least said first layer being transparent and a second layer for storing information, by converging a light flux onto said second layer through said first layer of one of said N types of optical discs loaded in said apparatus said apparatus comprising:

a composite converging optical device comprising:

- (i) a light emitting means for emitting said light flux;
- (ii) a converging means for converging said light flux on said second layer of said one of said N optical discs loaded in said apparatus; and
- (iii) an optical wave front transforming means disposed in an optical path connecting said light emitting means and said converging means for correcting an optical wave front of the light flux,

wherein said composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs, and (b) converges said light flux as a smaller spot diameter D with respect to one of said optical discs having a thinner one of said substrates onto said second layer of said loaded optical disc,

wherein said composite converging optical device differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said converging of said light flux, and

wherein a thickness of each of said first layers of said N types of optical discs is about 1.2mm or less.

28. An optical recording/reproducing system comprising:

(a) an optical recording/reproducing apparatus for recording, reproducing or erasing an information signal onto/from any selected one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said optical discs having at least said light layer being transparent and a second layer for storing information, by converging a light flux on said second layer through said first layer of one of said N types of optical discs loaded in said apparatus, said apparatus comprising:

a composite converging optical device, which comprises:

- (i) a light emitting means for emitting said light flux;
- (ii) a converging means for converging said light flux on said

second layer of said loaded one of said N optical discs; and

(iii) an optical wave front transforming means disposed in an optical path connecting said light emitting means and said converging means for correcting an optical wave front of the light flux;

a photo detecting means for detecting reflective light from said one of said N optical discs,

wherein said composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs and (b) converges said light flux as a spot with a smaller diameter D with respect to one of said optical discs having a thinner one of said substrates onto said second layer of said loaded optical disc,

wherein said composite converging optical device differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said converging of said light flux, and

wherein a thickness of each of said transparent substrates of said N types of optical discs is about 1.2mm or less;

(b) a signal processing means, responsive to one of (i) a reproduction signal, corresponding to said information signal, from said photo detecting means and (ii) receipt of recording data, corresponding to said information signal, for recording on said disk, for generating an output signal corresponding to said information signal for performing one of a reproducing operation and a recording operation on said disks; and

(c) a system controlling means coupled to said signal processing means for controlling generation of the output signal of said signal processing means.

29. An apparatus according to claim 26 wherein said composite converging optical device has different numerical apertures, and the light flux is converged as a spot with a smaller diameter D by employing a larger one of said numerical apertures.

30. An optical recording/reproducing apparatus as in claim 26, wherein each of said first layers comprises a transparent substrate.

31. An optical recording/reproducing system as in claim 28, wherein each of said first layers comprises a transparent substrate.

32. An optical recording/reproducing system according to claim

28 wherein said composite converging optical device has different numerical apertures, and the light flux is converged as a spot with a smaller diameter D by employing a larger one of said numerical apertures.

34. A system comprising:

(a) an optical recording/reproducing apparatus for recording, reproducing or erasing an information signal onto/from any selected one of N types (where $N \geq 2$) of optical discs having first layers of different thicknesses, each type of said optical discs having at least said light layer being transparent and a second layer for storing information, by converging a light flux on said second layer through said first layer of one of said N types of optical discs loaded in said apparatus, said apparatus comprising: a composite converging optical device, which comprises:

(i) a light emitting means for emitting said light flux;
(ii) a converging means for converging said light flux on said second layer of said loaded one of said N optical discs; and
(iii) an optical wave front transforming means disposed in an optical path connecting said light emitting means and said converging means for correcting an optical wave front of the light flux;

a photo detecting means for detecting reflective light from said one of said N optical discs,

wherein said composite converging optical device (a) performs aberration correction in correspondence with said first layer of said loaded one of said N optical discs and (b) converges said light flux as a spot with a smaller diameter D with respect to one of said optical discs having a thinner one of said substrates onto said second layer of said loaded optical disc,

wherein said composite converging optical device differently corrects the optical wave front of the light flux in correspondence with said different thickness of said N optical discs to provide said aberration correction and said converging of said light flux, and

wherein a thickness of each of said transparent substrates of said N types of optical discs is about 1.2mm or less;

(b) a signal processing apparatus including:

signal processing means, responsive to one of (i) a reproduction signal, corresponding to said information signal, from said photo detecting means and (ii) receipt of recording data, corresponding to said information signal, for recording on said disk, for generating an output signal corresponding to said information signal for performing one of a reproducing operation and a recording operation on said disks; and

system controlling means coupled to said signal processing means for controlling generation of the output signal of said signal processing means.

35. An apparatus according to claim 26, further comprising a disc discrimination means for discriminating the thickness of the first layer of the disc and for generating a discrimination signal in accordance with a result of the discrimination; and a controlling means for causing the composite converging optical device to converge the light flux as a spot with a particular diameter to minimize aberration due to the first layer in accordance with said disc discrimination signal.

36. A system according to claim 28, wherein said optical recording/reproducing apparatus further comprises a disc discrimination means for discriminating the thickness of the first layer of the disc and for generating a discrimination signal in accordance with a result of the discrimination; and a controlling means for causing the composite converging optical device to converge the light flux as a spot with a particular diameter to minimize aberration due to the first layer in accordance with said disc discrimination signal.

37. An apparatus according to claim 34, further comprising a disc discrimination means for discriminating the thickness of the first layer of the disc and for generating a discrimination signal in accordance with a result of the discrimination; and a controlling means for causing the composite converging optical device to converge the light flux as a spot with a particular diameter to minimize aberration due to the first layer in accordance with said disc discrimination signal.

38. A system as in claim 34, wherein each of said first layers comprises a transparent substrate.

EXHIBIT I
PATENT CLAIMS

1. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) N optical heads, N being greater than or equal to 2, each comprising:

- * light emitting means,

- * objective lenses, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses, each for converging the light flux which is emitted from the light emitting means onto the optical disc, and

- * a plurality of photo detecting means each for detecting the reflected light from the optical disc;

- * (b) N optical head moving means which are arranged below the optical disc and move the N optical heads in the radial direction of the optical disc;

- * (c) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating a discrimination signal in accordance with the result of the discrimination; and

- * (d) control means for selecting the optical head having the objective lens in which the occurrence of the aberration due to the disc substrate is smallest in accordance with the discrimination signal,

- * wherein the selected optical head records, reproduces or erases the information signal onto/from the optical disc.

2. An apparatus according to claim 1, further comprising backward moving means for moving the non-selected optical heads to the outside of the optical disc for a period of time when the optical head which has been selected by the control means is recording, reproducing, or erasing the information signal.

3. An apparatus according to claim 1, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc;

- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and

- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

4. An apparatus according to claim 2, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc;
- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and
- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

5. An apparatus according to claim 1, wherein numerical apertures of at least two or more of said N objective lenses differ.

6. An apparatus according to claim 2, wherein numerical apertures of at least two or more of said N objective lenses differ.

7. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) an optical head having N, N being greater than or equal to 2, converging optical systems each comprising:

- * light emitting means,

- * objective lenses, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses, each for converging the light flux which is emitted from the light emitting means onto the optical disc, and

- * a plurality of photo detecting means each for detecting the reflected light from the optical disc;

- * (b) optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;

- * (c) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating a discrimination signal in accordance with the result of the discrimination; and

- * (d) control means for allowing the light emitting means, which belongs to the converging optical system in which the occurrence of the aberration due to the disc substrate is smallest in accordance with the discrimination signal, to emit light,

- * wherein the selected converging optical system records, reproduces or erases the information signal onto/from the optical disc.

8. An apparatus according to claim 7, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc,
- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and
- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

9. An apparatus according to claim 7, wherein numerical apertures of at least two or more of said N objective lenses differ.

10. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) an optical head including:
 - * light emitting means,
 - * light flux dividing means which are arranged in the light flux from the emitting means and divide the emitted light flux into N, N being greater than or equal to 2, light fluxes and deflect in different directions,
 - * N objective lenses, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses, for respectively converging said N light fluxes onto the optical disc,
 - * light flux selecting means for selecting one of the N light fluxes divided by the light flux dividing means and for allowing said light flux to pass, and
 - * photo detecting means for detecting the light fluxes reflected by the optical disc;
- * (b) optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;
- * (c) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating a discrimination signal in accordance with the result of the discrimination; and
- * (d) control means for generating a control signal to the light flux selecting means in accordance with the discrimination signal and for selecting the light flux which passes through the objective lens in which the occurrence of the aberration due to the disc substrate is smallest,
- * wherein the optical head records, reproduces or erases the information signal onto/from the optical disc by the selected light flux.

11. An apparatus according to claim 10, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc,
- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and
- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

12. An apparatus according to claim 10, wherein numerical apertures of at least two or more of said N objective lenses differ.

13. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) an optical head including:
 - * an optical waveguide formed on a substrate,
 - * N light emitting means each for emitting a waveguide light into said optical waveguide, N being greater than or equal to 2,
 - * N converging grating couplers, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses, each for emitting the waveguide light supplied from said N light emitting means to the outside of the optical waveguide and for allowing the reflected light from the optical disc to enter, and
 - * N photo detecting means each for detecting reflected light and for generating an information signal;
- * (b) optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;
- * (c) selecting means for selecting the light emitting means to be allowed to emit the light from among the N emitting means;
- * (d) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating a discrimination signal according to the result of the discrimination; and
- * (e) control means for generating a control signal in accordance with the discrimination signal, for providing said control signal to said selecting means and for allowing the light emitting means for emitting the waveguide light into the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest,
- * wherein the optical head records, reproduces or erases the

information signal onto/from the optical disc by the light flux from the selected light emitting means.

14. An apparatus according to claim 13, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc;
- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and
- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

15. An apparatus according to claim 13, wherein numerical apertures of at least two or more of the N converging grating couplers differ.

16. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) an optical head including:
 - * an optical waveguide formed on a substrate,
 - * light emitting means for emitting a waveguide light into said optical waveguide,
 - * light flux dividing means for dividing the waveguide light emitted from the light emitting means into N divided waveguide lights, N being greater than or equal to 2,
 - * said N converging grating couplers, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses, each for emitting each of said N divided waveguide lights to the outside of the optical waveguide and for allowing the reflected light from the optical disc to enter, and
 - * N photo detecting means for respectively detecting said reflected lights from the N converging grating couplers and for generating information signals;
- * (b) optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;
- * (c) output switching means for selecting and outputting one of the output signals of said N photo detecting means;
- * (d) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating a discrimination signal in accordance with the result of the discrimination; and
- * (e) control means for generating a control signal to the

output switching means in accordance with the discrimination signal and for selecting the photo detecting means into which the waveguide light enters from the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest.

17. An apparatus according to claim 16, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc;
- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and
- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

18. An apparatus according to claim 16, wherein numerical apertures of at least two or more of the N converging grating couplers differ.

19. An optical recording/reproducing apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

- * (a) an optical head including:
 - * an optical waveguide formed on a substrate,
 - * light emitting means for emitting a waveguide light into said optical waveguide,
 - * optical path switching means which is arranged on an optical path of said waveguide light and switches the propagating direction of the waveguide light in N directions in accordance with a control signal, N being greater than or equal to 2,
 - * N converging grating couplers, whose aberrations have respectively been corrected for said N disc substrates having different thicknesses and which are respectively arranged in said N propagating directions which are switched by said optical path switching means and emit the waveguide light to the outside of the optical waveguide and allow the reflected light from the optical disc to enter, and
 - * photo detecting means for detecting the reflected light and generating an information signal;
- * (b) optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;
- * (c) disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and

for generating the discrimination signal in accordance with the result of the discrimination; and

- * (d) control means for generating a control signal to the optical path switching means in accordance with the discrimination signal and for switching the propagating direction of the waveguide light from the light emitting means to the direction of the converging grating coupler in which the occurrence of the aberration due to the disc substrate is smallest,

- * wherein the optical head records, reproduces or erases the information signal onto/from the optical disc by the light flux emitted from the selected converging grating coupler.

20. An apparatus according to claim 19 , wherein said optical path switching means combines deflecting means for changing the propagating direction of the waveguide light by a deflection angle according to a input signal,

- * and wherein said apparatus comprises:

- * tracking error detecting means for detecting a tracking error amount of a converged spot which has been converged onto the optical disc and for generating a tracking error signal; and

- * tracking control means for changing the input signal to the deflecting means in accordance with said tracking error signal and for eliminating the tracking error of the converged spot.

21. An apparatus according to claim 19, wherein said disc discriminating means comprises:

- * a cartridge for enclosing the optical disc;

- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and

- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

22. An apparatus according to claim 20, wherein said disc discrimination means comprises:

- * a cartridge for enclosing the optical disc;

- * a discrimination hole which is formed on the cartridge and whose opening/closing state differs in correspondence to the thickness of the disc substrate of the optical disc; and

- * detecting means for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal.

23. An apparatus according to claim 19, wherein numerical apertures of at least two or more of the N converging grating couplers differ.

24. An apparatus according to claim 20, wherein numerical apertures of at least two or more of the N converging grating couplers differ.

EXHIBIT II

CANCELED ORIGINAL

CLAIMS 1 and 6

1. An optical disc apparatus for recording, reproducing or erasing an information signal by converging a light flux onto/from a recording layer through a transparent disc substrate, comprising:

N converging means whose aberrations have respectively been corrected for said N ($N \geq 2$) disc substrates having different thicknesses;

disc discriminating means for discriminating the thickness of the disc substrate of a loaded optical disc and for generating a discrimination signal corresponding to the result of the discrimination; and

control means for selecting the converging means in which the occurrence of the aberration due to the disc substrate is smallest in accordance with the discrimination signal.

6. An apparatus according to claim 1, wherein said converging means comprises objective lens and aberration correcting means, and wherein said apparatus comprises:

an optical head having

light emitting means,

said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc,

photo detecting means for detecting the reflected light from the optical disc,

said N aberration correcting means, and

holding means for holding said N aberration correcting means, for selecting one of the N aberration correcting means in accordance with a control signal and for moving onto an optical path between the light emitting means and the optical disc;

optical head moving means which is arranged below the optical disc and moves the optical head in the radial direction of the optical disc;

disc discriminating means for discriminating the thickness of the disc substrate of the loaded optical disc and for generating the discrimination signal according to the result of the discrimination;

and control means for generating the control signal to said holding means in accordance with the discrimination signal and for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,

and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.

EXHIBIT III

COMPARISON OF CANCELED
CLAIM 6 WITH PATENT
CLAIMS

6. An apparatus according to claim 1,	CLAIM 1
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 1 recites plural objective lenses but lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 1 has plural optical heads.
(a) light emitting means,	Claim 1 has a light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	Claim 1 has objective lenses each for converging the light flux emitted from the light emitting means onto the optical disc.
(c) photo detecting means for detecting the reflected light from the optical disc,	Claim 1 has plural photo detecting means for detecting the reflected light from the optical disc.
(d) said N aberration correcting means, and	Claim 1 lacks this element.
(e) holding means	Claim 1 lacks this element.
(i) for holding said N aberration correcting means,	Claim 1 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 1 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc,	Claim 1 lacks this element.
(2) optical head moving means	Claim 1 recites N optical head moving means.
(a) which is arranged below the optical disc and	The N moving means are arranged below the optical disc.
(b) moves the optical head in the radial direction of the optical disc,	The N moving means move the N optical heads radially of the optical disc.
(3) disc discriminating means	Claim 1 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 1 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination, and	Claim 1 recites this element.
(4) control means	Claim 1 recites a different control means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	Claim 1 lacks this feature because its control means selects the optical head with the objective lens yielding the smallest aberration.
(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 1 lacks this feature.
and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 1 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.

6. An apparatus according to claim 1,	CLAIM 7
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 7 recites plural objective lenses but lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 7 recites an optical head.
(a) light emitting means,	The optical head includes a light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	The optical head includes objective lenses.
(c) photo detecting means for detecting the reflected light from the optical disc,	The optical head includes plural photo detecting means.
(d) said N aberration correcting means, and	Claim 7 lacks an aberration correcting means.
(e) holding means	Claim 7 lacks this element.
(i) for holding said N aberration correcting means,	Claim 7 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 7 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc;	Claim 7 lacks this element.
(2) optical head moving means	Claim 7 recites this element.
(a) which is arranged below the optical disc and	Claim 7 recites this element.
(b) moves the optical head in the radial direction of the optical disc,	Claim 7 recites this element.
(3) disc discriminating means	Claim 7 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 7 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination; and	Claim 7 recites this element.
(4) control means	Claim 7 recites a different control means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	Claim 7 recites a control means but it allows the light emitting means belonging to the converging optical system having a smallest aberration to emit light.
(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 7 lacks this feature.

and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 7 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.
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6. An apparatus according to claim 1,	CLAIM 10
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 10 recites plural objective lenses but lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 10 recites an optical head.
(a) light emitting means,	Claim 10 recites a light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	Claim 10 recites N objective lenses. Claim 10 also recites light flux dividing means and light flux selecting means.
(c) photo detecting means for detecting the reflected light from the optical disc,	Claim 10 recites a photo detecting means.
(d) said N aberration correcting means, and	Claim 10 lacks this element.
(e) holding means	Claim 10 lacks this element.
(i) for holding said N aberration correcting means,	Claim 10 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 10 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc,	Claim 10 lacks this element.
(2) optical head moving means	Claim 10 recites this element.
(a) which is arranged below the optical disc and	Claim 10 recites this element.
(b) moves the optical head in the radial direction of the optical disc,	Claim 10 recites this element.
(3) disc discriminating means	Claim 10 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 10 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination; and	Claim 10 recites this element.
(4) control means	Claim 10 recites a different control means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	Claim 10 recites a control means that generates a control signal to the selecting means and selects the light flux which passes through the objective lens having the smallest aberration.

(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 10 lacks this feature.
and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 10 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.

6. An apparatus according to claim 1,	CLAIM 13
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 13 recites plural converging grating couplers instead of objective lenses and lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 13 recites an optical head including an optical waveguide.
(a) light emitting means,	Claim 13 recites N light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	Claim 13 recites N converging grating couplers whose aberrations have respectively been corrected.
(c) photo detecting means for detecting the reflected light from the optical disc,	Claim 13 recites N photo detectors.
(d) said N aberration correcting means, and	Claim 13 lacks this element.
(e) holding means	Claim 13 lacks this element.
(i) for holding said N aberration correcting means,	Claim 13 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 13 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc,	Claim 13 lacks this element.
(2) optical head moving means	Claim 13 recites this element.
(a) which is arranged below the optical disc and	Claim 13 recites this element.
(b) moves the optical head in the radial direction of the optical disc,	Claim 13 recites this element.
(3) disc discriminating means	Claim 13 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 13 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination, and	Claim 13 recites this element.

(4) control means	Claim 13 recites a different control means. Claim 13 recites a selecting means for selecting one of the N light emitting means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	The control means generates a control signal to the selecting means to enable one of the light emitting means to emit waveguide light to the converging grating coupler with the smallest aberration.
(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 13 lacks this feature.
and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 13 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.

6. An apparatus according to claim 1,	CLAIM 16
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 16 recites plural converging grating couplers instead of objective lenses and lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 16 recites an optical head including an optical waveguide. Claim 16 also recites light flux dividing means.
(a) light emitting means,	Claim 16 recites light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	Claim 16 recites N converging grating couplers whose aberrations have respectively been corrected.
(c) photo detecting means for detecting the reflected light from the optical disc,	Claim 16 recites N photo detecting means.
(d) said N aberration correcting means, and	Claim 16 lacks this element.
(e) holding means	Claim 16 lacks this element.
(i) for holding said N aberration correcting means,	Claim 16 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 16 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc;	Claim 16 lacks this element.
(2) optical head moving means	Claim 16 recites this element.
(a) which is arranged below the optical disc and	Claim 16 recites this element.
(b) moves the optical head in the radial direction of the optical disc;	Claim 16 recites this element.

(3) disc discriminating means	Claim 16 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 16 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination; and	Claim 16 recites this element.
(4) control means	Claim 16 recites a different control means. Claim 16 also recites an output switching means for selecting and outputting an output signal of one of the N photo detecting means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	The control means generates a control signal to the output switching means and selects the photo detecting means receiving light from the converging grating coupler with the smallest aberration.
(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 16 lacks this feature.
and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 16 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.

6. An apparatus according to claim 1,	CLAIM 19
wherein said converging means (Note: canceled claim 1 recites N converging means) comprises (1) objective lens and (2) aberration correcting means,	Claim 19 recites plural converging grating couplers instead of objective lenses and lacks an aberration correcting means.
wherein said apparatus comprises: (1) an optical head having	Claim 19 recites an optical head including an optical waveguide and an optical path switching means.
(a) light emitting means,	Claim 19 recites a light emitting means.
(b) said objective lens each for converging the light flux emitted from the light emitting means onto the optical disc (Note: this calls for plural objective lenses),	Claim 19 recites N converging grating couplers whose aberrations have respectively been corrected.
(c) photo detecting means for detecting the reflected light from the optical disc,	Claim 19 recites a photo-detecting means.
(d) said N aberration correcting means, and	Claim 19 lacks this element.
(e) holding means	Claim 19 lacks this element.
(i) for holding said N aberration correcting means,	Claim 19 lacks this element.
(ii) for selecting one of the N aberration correcting means in accordance with a control signal and	Claim 19 lacks this element.
(iii) for moving onto an optical path between the light emitting means and the optical disc,	Claim 19 lacks this element.
(2) optical head moving means	Claim 19 recites this element.

(a) which is arranged below the optical disc and	Claim 19 recites this element.
(b) moves the optical head in the radial direction of the optical disc;	Claim 19 recites this element.
(3) disc discriminating means	Claim 19 recites this element.
(a) for discriminating the thickness of the disc substrate of the loaded optical disc and	Claim 19 recites this element.
(b) for generating the discrimination signal according to the result of the discrimination; and	Claim 19 recites this element.
(4) control means	Claim 19 recites a different control means.
(a) for generating the control signal to said holding means in accordance with the discrimination signal and	The control means generates a control signal to the switching means and switches the propagation direction of the waveguide light to the converging grating coupler with the smallest aberration.
(b) for moving the aberration correcting means onto said optical path in which the occurrence of the aberration due to the disc substrate is smallest onto said optical path,	Claim 19 lacks this feature.
and wherein the optical head records, reproduces, or erases the information signal onto/from the optical disc by the light flux which has transmitted the selected aberration correcting means.	Claim 19 recites that the optical head records, reproduces, or erases the information signal onto/from the optical disc but lacks everything else of this wherein clause.